Aeroelastic Analysis of B49 blade-Blatigue Project

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Summary:
This report is part of the EUDP Blatigue project, Fast and efficient fatigue test of large wind turbine blades. In the study the Siemens B49 blade loads are computed using HAWC2 aeroelastic code. The blade is coupled in a generic wind turbine tower and nacelle structure within HAWC2. Furthermore the basic DTU WE controller is used. The aim is to evaluate the blade fatigue and ultimate loads based on the IEC 61400-1 ed.3 standard. The results are further used in the project for the set-up and testing of the real blade at the DTU Risø Large Scale Facility.

In the first part the model properties are summarized. Then the IEC load cases are simulated using the HAWC2 code and the analysis is focused on the blade performance. A blade load comparison between HAWC2 and the Siemens results is presented together with a summary of the uncertainties related with the present analysis. Finally, an analysis is performed on a potential way to compute the blade lifetime fatigue damage based on few time series instead of running the full design load basis.

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